

Walt Belter

OAK RIDGE NATIONAL LABORATORY

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This document has been approved for release
to the public by:

Mr. Walter G. Belter
Environmental & Sanitary Engineering Branch
Division of Reactor Development
U. S. Atomic Energy Commission
Washington 25, D. C.

Daniel R. Hamlin 11/16/95
Technical Information Officer Date
ORNL Site

Dear Walt:

In response to your request, I am pleased to provide further information on the reasons why large quantities of radioactivity were discharged to the Oak Ridge National Laboratory pits in 1959. As you will see from the following, the discharges occurred through a controlled sequence of events and not via an accidental release.

In 1957 the Thorex Pilot Plant processed very short-cooled fuel. Radioactivity levels encountered during this processing were higher by a factor of ten than in any program before or since at ORNL. The Laboratory "hot" waste system did not receive the bulk of this radioactivity, however, because the first cycle raffinate was held in the pilot plant tanks for about a year to allow U-233 to grow into the solution from Pa-233 decay. This material was reprocessed in 1958, but the waste resulting from it was much lower in radioactivity because of the long decay. The short-cooled Thorex program is documented in ORNL Central Files Memorandum 58-6-1.

During the first half of 1959, ten tons of 90-day-cooled fuel from the SNAP program plus 20 tons of 230-day-cooled fuel from the Pu-240 program were processed. The SNAP program yielded approximately 500,000 curies in 10,000 gallons of first cycle waste and the Pu-240 program yielded approximately 2,000,000 curies in 15,000 gallons of first cycle waste. This waste was discharged at an average rate of about 500 gallons per day to the large concrete receiving tank in the ORNL "hot" waste system, where it was diluted with lower level waste and held several weeks for the decay of short-lived radioisotopes. By the time it was discharged to the seepage pits the activity level was reduced through dilution and decay to about 0.08 curies per gallon; however, the total activity was substantially more than had previously been sent to the pits.

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As can be seen from the table below, the activity discharged to the pits has been increased constantly since their inception in 1954. Although most of the activity in the waste arises in the pilot plant, a steadily increasing number of other sources of high-level waste have arisen at ORNL. These include the radioisotope production program, various high-radiation-level hot cell experiments, reactors, and experimental loops.

DISCHARGES TO ORNL WASTE SEEPAGE PITS

<u>Year</u>	<u>Gross Curies</u>	<u>Total Volume Gallons</u>	<u>Average Activity Level Curies/Gallon</u>
1954	7,200	910,000	0.01
1955	21,400	1,675,000	0.013
1956	35,000	2,700,000	0.013
1957	42,000	2,900,000	0.014
1958	53,000	3,200,000	0.016
1959	280,000	3,600,000	0.078

Regardless of the future of the power reactor fuel processing program at ORNL, we are convinced that the Laboratory has need for a good high-level waste system. The only question raised by the uncertainty of the power reactor fuel reprocessing program is the proper volume of tankage to provide.

Please advise me if you require additional information on this matter.

Very truly yours,

Original Signed

By F. R. Bruce

F. R. Bruce, Director
Radiation Safety and Control

FRB:mb

cc: J. A. Swartout
J. O. Blomeke

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